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Testimony of Dennis Wallace
Hearing on FAA Aircraft Certification
And Manufacturing of the Eclipse EA-500

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Good Morning Mr. Chairman and Honorable Members of this Committee.

My name is Dennis Wallace. I am a software engineer employed by the FAA and I am currently assigned to the Rotorcraft Certification Office in Fort Worth, Texas as the FAA Software Technical Specialist. I have been employed by the FAA for the past twelve years.

Prior to my employment with the FAA I worked for the Department of Defense in various positions for twenty-six years. I am also a veteran of the United States Air Force, having served four years on active duty and twenty-one years on active reserve.

I am here before you today to give an account of my recollection of the events in the final days leading up to the issuance of an FAA Type Certificate for the Eclipse 500 very light-jet airplane, which is being developed and manufactured by the Eclipse Corporation, in Albuquerque, New Mexico.

My specific role in this project was to provide typical FAA certification oversight of Eclipse and its' suppliers development of airborne software for this aircraft to ensure that it satisfied the safety requirements defined in the applicable Federal Aviation Regulations. According to what the company submitted, and FAA agreed to, aircraft level Plan for Software Aspects of Certification (PSAC), Eclipse and its' suppliers were to develop their software in accordance with the guidelines of RTCA DO-178B as a means to secure FAA approval of their digital computer software as a showing of compliance to 14 CFR 23.1301 and 14 CFR 23.1309. As there are no specific regulations that discuss how to certify software, these are the governing safety regulations and DO-178B is the standard, FAA recommended approach for the certification aspects of airborne software.

DO-178B was published in 1992 and has become the universally accepted governing procedure for such software certification efforts. DO-178B uses layers of checks and balances in an attempt to prevent errors from manifesting in the code. These include a defined and structured development process, independent peer reviews, quality assurance, configuration management and the rigor of testing that must be accomplished.

I was initially assigned to work on this project in 2001 and since that time I have been the primary person at the FAA responsible for oversight of the software certification activities on this project, which also included the conduct of numerous software development audits at Eclipse and also at its' suppliers.

On the morning of Tuesday, September 12th 2006, while conducting a software review at one of Eclipse's suppliers, I received a telephone call from the FAA program manager of the Airplane Certification Office, ASW-150, informing me that I needed to attend a meeting at a hotel in Albuquerque on Wednesday evening, September 13th 2006 and that I should be prepared to give a status report for the software being developed by that particular supplier. When I arrived for that meeting, I was prepared to report to those attending the meeting the facts that the supplier had not yet completed final design

review, had not entered test readiness review, and that the company was aware that "dead code" (inactive code) still needed to be removed. Most importantly, I was also going to report that, in my opinion, only approximately one-third of the required objectives of RTCA DO-178B had been satisfied.

Instead of support, what I received was a rather harsh line of questioning from the FAA AIR-1 and AIR-100 managers that basically questioned the validity and utility of the long-accepted RTCA DO-178B software certification procedure. They also harped on the fact that there were no airworthiness rules specifically related to software certification.

I tried to explain to them that Eclipse had signed up to comply with DO-178B for themselves and their suppliers via the aforementioned aircraft level PSAC. I went on to state to them that while it is true that there are no Part 23 rules that are unique to software approval, DO-178B is a traditionally and universally accepted means to secure FAA approval for digital computer software as a showing of compliance to the general rules 14 CFR 23.1301 and 14 CFR 23.1309, which are applicable to all Systems & Equipment onboard the aircraft. Also, DO-178B provides a level playing field for all aircraft software developers and, as such, it has contributed to a standardized approach to the software aspects of certification – standardization being a goal which FAA management has publicly espoused and promoted to its workforce for years. As an aside, I told them that this was how I teach software aspects of certification to all of the FAA engineers at the FAA Academy and if I was doing this incorrectly, then maybe we need to change the course content to reflect how it should be done.

I was told by the AIR-1 manager in what I perceived to be a very direct, animated, and threatening manner, that my position on this constituted "antiquated thinking" and that I best "start thinking outside the box." He further stated that we were here to "save a company" and then, looking directly at the then Rotorcraft Directorate manager, said he "shouldn't have to come to Albuquerque to do his job." That was when I realized two things: 1) The supplier was not the problem- I was perceived by management to be the problem - because I wasn't going to accept the software since it had not been shown by the applicant to be compliant to the applicable safety regulations, and 2) The bus had already left the station and not only was I not on the bus, I felt I was being thrown under it. I remained silent for the rest of the meeting because it was clearly evident from the statements made that management intended to drive the bus on this certification effort and that they would not listen to me, despite the fact that I felt I had greater cognizance of both the project design and the governing applicable regulations. My reference to "the bus" here stems from a book that FAA management has promoted as a must read on management technique.

On the following morning, Thursday, September 14th 2006, I attended a meeting at Eclipse, along with other FAA personnel. In attendance were, if not all, the majority of FAA employees from the previous evening's FAA only meeting, and a dozen or so Eclipse employees. In that meeting, the company proposed a mitigation strategy that the company wanted the FAA to accept as an alternative to the supplier having to satisfying

the software objectives of RTCA DO-178B. It is my "continued" opinion to this day that FAA management was strongly encouraging the FAA team to accept this proposed company mitigation strategy.

The next week, I telephoned the supplier's Designated Engineering Representative (DER) and asked him to submit an FAA Form 8110-3 stating that the software satisfies DO-178B and complies to 14 CFR 23.1301 and 23.1309. I received the requested 8110-3s dated September 19th 2006 stating "23.1301 (a) and (d) 23.1309 (a), (b)(1) as applicable to the intended installation to the extent demonstrated by partial compliance with RTCA DO-178B." This became part of the mitigation package (EAC R02-5014 Rev B) for which I was asked to sign off on. I did so on September 28th 2006 by stating only that "I concur that the software partially complies with DO-178B." The clear implication here is that neither the DER, nor I, concurred that the software was completely compliant.

When I arrived at work on Monday October 2nd 2006 I was surprised to hear that Eclipse had already received its' FAA Type Certificate the previous Saturday, September 30th 2006. Subsequent to that I went back to work on other projects and do not recall having any significant contact with Eclipse until the spring of 2007, when the company presented a design change to their AVIO system. I am currently working that design change project.

This concludes my opening remarks. Thank you, Mr. Chairman and Honorable Members of this Committee.